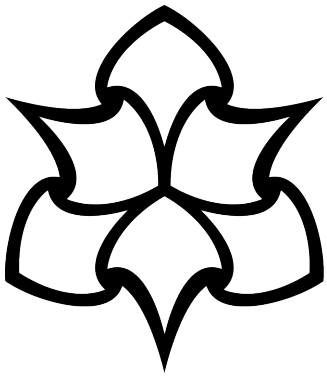

esports Matrix: Structuring the esports Research Agenda

Abstract
The popularity of Electronic Sports (esports) have grown tremendously in the last few years, becoming one of the most popular forms of digital entertainment. Despite continued growth, definitions and classifications of esports remain elusive, and the industry is still considered by many to be in its infancy. Understanding of esports originate from diverse, sometimes conflicting fields, which has created fragmented interpretations of its definition, positioning and core components. This has hindered esports from embracing opportunities afforded by emerging digital technologies and progressing as a distinct field. The purpose of this conceptual paper is threefold, to redefine esports, propose a unified framework to capitalise on esports business potential, and inspire a more structured future esports research agenda. The proposed esports Matrix, presents four distinct realms that distinguish esports; esports as a representation of current physical sports (sports digitalisation), esports as traditional (multi-player) game experience (competitive multiplayer computer games), esports that modify existing sports, player rules and setups through digital augmentations (digitally enhanced sports), and new types of esports involving emerging technologies such as virtual and augmented reality (immersive reality sports). The esports Matrix was developed incorporating industry expertise thus verifying its suitability and relevance to advance conceptual and empirical understanding, and importantly, facilitating a more structured approach, to enable businesses to realise the potential of esports.

Key words: *esports, Immersive technologies, Digitisation*

1. Introduction

Electronic Sports (esports) is one of the fastest growing forms of digital entertainment and its popularity has grown rapidly, driven largely by technological developments, such as the increased prevalence of online gaming (Hamari & Sjöblom, 2017), accessibility to technology and access to elite competition (Jenny et al., 2017). The global esports audience is predicted to reach 495 million by the end of 2020 (NewZoo, 2020). Viewership of major esports tournaments often now exceed that of traditional sporting events. For example, the 2017 esports League of Legends World Championship received 60 million viewers, whereas the National Basketball Association (NBA) attracted 20.4 million viewers (Steinkuehler, 2019). The esports industry generated USD1.2 billion in 2019 (Gawrysiak et al., 2020), in fact surpassing predictions of USD 1 billion by 2020 (NewZoo, 2020). By 2021, esports finals are predicted to attract 84 million viewers in the U.S, surpassing every other professional sports league (e.g. 63 million viewers of NBA) except the NFL (Syracuse University, 2020). This is likely to have increased significantly since demand and followership of esports becomes particularly evident in times such as the COVID-19 crisis, where a large number of people are staying home due to enforced social distancing and lockdown measures (Heinrich, 2020). If esports growth continues at the same rate, it is crucial to structure esports in a more uniform way, to help support industry growth and coordinate future academic research streams.

Esports are organised video game competitions, also commonly referred to as cybersport, virtual sport, and competitive gaming (Jenny et al., 2017). In general terms, esports refers to "an organised and competitive approach to playing computer games" (Witkowski, 2012: 350). Esports has gained increased academic attention, examining different aspects such as motivations to engage and watch esports (Hamari & Sjöblom, 2017; Hilvert-Bruce et al., 2018), consumption habits (Seo & Jung, 2016), economics (Garcìa & Murillo, 2019; Parshaknov & Zavertiaeva, 2018) and the psychology of esports (Bányai et al., 2019). However, despite "the rise, and continued industry growth of esports over the last decade, to date there is little effort to coordinate research related to the subject" (Steinkuehler, 2019: 1). While the popularity and exponential growth of esports is expected to continue, there is no structured framework, nor uniform understanding of the extent esports will shape and influence our interpretation of sports now, and in the near future. In an attempt to redefine esports by coordinating extant thinking and approaches to esports, this paper provides an overview of definitions to date, and proposes a working definition; electronic sports (esports) involves competitive, organised or technologically enabled activities encompassing varying degrees of physicality, virtuality and technological immersion.

Our working definition encompasses conflicting debates in extant literature (see section 2), the proposed esports matrix (see section 4) and suggested future trends (see section 6).

At present, "research focusing on esports has been mainly qualitative and therewith so far rather exploratory and not ultimately generalisable" (Hallmann & Giel, 2018: 17). Similarly, Steinkuehler et al. (2019: 3) stated "there is little consensus across domains as to how to define or bound esports itself as a phenomenon...esports thus far refers to a broad variety of activity and participation, making it difficult to out competing claims and explanations about the phenomenon in relationships to one another in ways that might catalyse the construction of knowledge". Specific 'categories' of esport seem to raise unique challenges and opportunities that differ in relevance. Without a proper categorisation, a gap remains in the business and academic perspectives of how to effectively capitalise on the opportunities, impact and contribution presented by the esports industry.

A key area of research will undoubtedly evolve around the consumer market and related perspectives, possibly with a focus on other well-established sectors such as leisure, economics, sports, psychology and management sciences. However, the lack of a structured, cohesive academic research approach is rather unsettling considering the contribution to the consumer market it has already made and its continued rapid growth fuelled by external factors such as COVID-19. The absence of a uniform approach could potentially create a number of issues, such as failure to realise future industry opportunities, slowing down the time taken for the industry to develop and failure to capture market trends (e.g. caused by COVID-19). Furthermore, recent technological developments, in combination with esports related activities, necessitate investigation and updating existing definitions of esports and related components to fully realise the esports market potential and capitalise on future opportunities.

Despite rapid growth, the esports industry is still regarded to be in its infancy with limited participation, spectators and recognition of esports as a form of 'sport', but popularity is increasing rapidly. Current technological developments are redefining how we view sporting events (e.g. football), it is expected this will also impact how esports are categorised, performed and consumed. Major investments in esports related activities are rooted to Asian regions (Bányai et al., 2019), and is steadily increasing in the US, and more so in Europe. Recent revenue predictions suggest the Chinese esports market is estimated to total $385.1 million followed by North America ($252.8 million) and Western Europe ($201.2 million) (NewZoo, 2020). Esports popularity, spectatorship and participation is increasing rapidly, with sports fans looking for something to replace the void because of COVID-19 related cancellation of all major sporting events. For example, Chinese esports revenue is reported to have increased 18% from 2019 (NewZoo, 2020). Consequently, there is a need to examine esports more holistically, ensuring cross-discipline conversations and theoretical approaches are explored in order to more accurately define the esports industry, and by doing so set, and unify research agendas, as well as identify possible development areas.

This paper addresses Reitman et al.'s (2019: 12) call for further research; "esports research's nascency means there are still fundamental questions about how the field is unfolding. It means researchers involved in the early work - and those introducing the space to unfamiliar fields - have an opportunity to shape its growth". Extant esports literature is scattered across multiple disciplines, including business, sports science, economics, cognitive science, informatics, law, media studies and sociology (Anderson, 2010; Chikish et al., 2019; Reitman et al., 2019). In a review of academic publications between 2002-2018, Reitman et al. (2019) confirmed whilst esports has been explored in several disciplines, this can in fact "actively impede progress in our understanding". However, their study failed to consider esports research from all disciplines. For example, sports economics is regarded a distinct research field, with numerous studies applying sportmetrics (e.g. use of economic theories and data) to explain players behaviours, engagement and actions (Goff and Tollison, 1990; Shmanske & Kahane, 2011; Parhakov & Zavertiaeva, 2018). In fact, Karhulahti (2017) claimed the 'e' should be interpreted as economic rather than electronic, since organised competition in esports requires a governed commercial product (e.g. game). As a result, it is difficult to synthesise the perspectives brought forth and develop a uniform research stream, which we argue is in fact hindering progression and esports industry growth.

This paper will address this gap, by providing a critical and holistic examination of key areas such as impact, acceptance and barriers to esports, to develop a unified framework to capitalise on esports business potential. The framework extends current understanding of esports, integrating multiple, often conflicting perspectives, in a unified manner, to progress esports research, pertinence and traction. Given the influence of technologies, the paper also discusses the affordances offered by immersive technologies, such as augmented reality (AR) and virtual reality (VR), and their expected impact on the industry and consumer market, such as consumer behaviour and experience consumption through esports. The purpose of this paper is threefold. The first is to redefine esports, considering the relative infancy of esports as a sector, and multidisciplinary approaches, we propose a working definition, to combine and unify extant diverse conceptualisations discussed in section 2. The second is to propose a framework, the esports matrix (see section 4), which outlines four realms of esports. The third, in section 6, is to propose recommendations for further research, based on the four realms, to inspire further conceptual and empirical research in esports in a more structured and uniform manner.

2. (Re)defining esports

There are many "different definitions of what esports comprise, although there are some similar characteristics" (Bányai et al., 2019: 252). Whilst some consider the term esports an oxymoron, suggesting you cannot have electronic sports (Witkowski, 2012), others believe esports "electronically extend athletes in digitally represented sporting worlds" and is thus an alternative sports reality (Hemphill, 2005: 1999). Moreover, Garcìa and Murillo (2019: 170) claimed prior to official or definitional acknowledgment of esports, first it is necessary and relevant for researchers to define whether esports are a sporting activity. Depending on the discipline "esports is a nontrivial debate that underlines scholars' framing of their research", with varying degrees of emphasis on physicality, computer mediation, infrastructure and spectatorship (Reitman et al., 2019: 9). Before synthesising and establishing distinct categories in esports, it is sensible to explore the definitions that have been formulated in various fields.

Wagner (2006: 182) in an attempt to overcome confusion developed a now widely accepted definition of esports as "an area of sports activities in which people develop and train mental or physical abilities in the use of information and communication technologies". However, this is criticised to not truly represent esports, which can be both a mental and physical activity. This is paramount since physicality is proposed to be the distinguishing characteristic separating gaming from sport (Jenny et al., 2017). In addition, some believe this definition leaves ambiguity towards how esports are played and aspects of competition (Jenny et al., 2017), by trivialising the role of technologies, instead focusing on similarities with traditional sports (Hamari & Sjöblom, 2017; Reitman et al., 2019). Hence, new definitions emerged that focus on esports as a form of alternate sports, or a special way of using or engaging with gameplay (Bányai et al., 2019). In addition, we argue that competition is not always the primary goal of esports, but esports can also embody characteristics such as collaboration and entertainment. The degree of competition depends on the specific context, and casual esports players are equally as important to the industry as competitive players. We understand casual games as easy to grasp and be played in short time durations and ad hoc settings (Oyson, 2020). More than half of esports gamers are considered casual gamers, and according to AppAnnie (2020), in 2019, the percentage of casual gamers accounted for 82% of downloaded games. However, as the industry continues to grow, it is likely even typically non-competitive esports games, such as Overwatch will introduce leagues and become increasingly competitive, in line with increasing demand, technological advances and to remain a competitor in the growing marketplace.

In a more recent definition, Hamari and Sjöblom (2017: 211) suggested "esports as a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the esports system are mediated by human-computer interfaces. In more practical terms, esports refer to competitive video gaming (broadcasted on the internet)". This emphasises enhanced communication facilitated by mediating technologies (Reitman et al., 2019). However, again this raises questions as to whether esports is a competitive sport based activity or recreational activity (Hallmann & Giel, 2018). Such definitions attempt to theoretically compare esports

to sports by examining defining characteristics and similarities. Within esports, often “the sporting activity itself is computer-mediated”, thus traditional sports fans often contest that esports is a sport, claiming “player competence is not measure via either their physical prowess or finesse as the esports athlete appear to be simply riveted to their chairs" (Hamari & Sjöblom, 2018: 3). Unlike traditional sports, esports does not depend on the physical abilities of participants (Parhakov & Zavertiaev, 2018). This contention is heightened further by the assumption society “generally sees avid video game players as being lazy and overweight adults or children with too much time on their hands. They associate esports athletes with this same view” (Filchenko, 2018: 1). Often, it is assumed “because esports aren’t physically exerting, they shouldn’t be considered actual sports" (Filchenko, 2018: 1).

Debate of whether esports falls into the same categories as traditional sports began as early as 1999, when founder of the Online Gamers Association (OGA), Mat Bettison, argued that esports would make the same contribution as traditional sports. Historically, the English Sports Council disregarded esports as a sport (Wagner, 2006), and upon recent review, presidents of the International Olympic Committee maintained that esports is not a traditional sport, since it lacks physical activity and organisational structures (Eberhardt, 2017). Crawford and Gosling (2009) argued that esports should incorporate similar features as traditional sports, such as interpersonal competition, skill training and development or the attainment of a specific goal that is accepted by all participants of the sport. Attempting to distinguish esports from traditional sporting activities, Jenny et al. (2017) identified six characteristics of sports necessary to classify an activity as sport, including; the existence of play and competition, rules, requirement of skills, having a broad following, physicality and institutionalisation. Of these characteristics, it was suggested esports satisfies each, except the extent to which esports involve physicality or have achieved institutional stability where social institutions impose regulatory rules remain the subject of debate (Jenny et al., 2017). Garcìa and Murillo (2019) contended that “official recognition of esport[s] as sport is still pending, at an academic level it seems that there is an overall agreement” since the most commonly accepted definitions of esports (e.g. Wagner, 2006; Jenny et al. 2017) consider or satisfy the activities that characterise traditional sports. Karhulahti (2017:45) claimed associating esports with sports does more harm than good, rather “esports operates on gaming systems that have been designed as commercial products”. In line with this, we propose that it is limiting to compare esports to sports, since it is still an evolving and emerging field, hence, satisfying these six ‘sports’ characteristics is not yet a necessity. It is problematic to assume that if esports does not demonstrate the same characteristics as sport, by definition, it therefore cannot be considered as a sport until it fulfils these. In fact, esports offers many opportunities beyond what we currently understand from traditional sports and it is likely that the attributes of both sports and esports will evolve in the future.

Ma et al. (2013) examined the differences between esports players and casual gamers, identifying esports players as professionals, who play for competition, rather than fun or relaxation, and thus playing esports is their job. Nowadays, many video game players define themselves as professional gamers, or esports players, and playing esports is their job (Bányai et al., 2019). Moreover, there is increased acknowledgement of the increased accessibility of esports from individuals hosting tournaments in their bedrooms to professional organised tournaments and varying player abilities, from skilled professional players, to casual average players (Whon & Freeman, 2020). Whilst debate as to whether esports can be considered a sport is ongoing “esports is now becoming more accepted as a sport and gamers are being identified as athletes within society today” (Jenny et al., 2017: 1). Similar debates are evident in academic literature, and remain ongoing.

From the perspective of video games as sports, Funk et al. (2018: 9) argued “while all esports are video games, not all video gaming should be classified as sport”. They proposed video games must have structure (e.g. rules), be organised (e.g. adherence to rules) and be competitive (e.g. winners and losers) to be considered a sport. This is supported by literature from sports economics, which view esports as organised competitions governed by commercial products (e.g. video games) (Karhulahti, 2017; Parhakov & Zavertiaeva, 2018). Hence, in addition to physical activity, the need for institutionalisation, with official governing bodies and standardisation is considered necessary to define esports as a sport (Funk et al., 2018; Jenny et al., 2017). This perception is illustrated by Jenny et al. (2017: 4) simple

definition of esports as “organised video game competitions”. Along the same lines Maric (2011:6) define esports as “organised and competitive video gaming” and Witkowski (2012:350) described esports as “an organised and competitive approach to playing video games”. For example, sport-based video games such as FIFA 17 or Madden NFL 17 “are virtual representations of traditional sport” but do not have formal tournaments, leagues and events, and therefore do not qualify as sports because they do not fulfil the requirements for structure, organisation, and institutionalisation (Funk et al., 2018: 9). However, esports games such as League of Legends and Counter Strike do have “formal ranking systems, match players based on skill level, and matches resulting in definitive winners and losers” (Funk et al., 2018: 9), hence, fulfilling the requirements to be classified as a sport.

Witkowski (2012) examined the sportiness of esports, in particular player physicality and the relationships between human performance and technologies, suggesting that interaction with technologies (e.g. esports) replicate the physicality of playing traditional sports. Although they believe it problematic to compare esports to traditional sports, Hallmann and Giel (2018) claimed, similar to tennis, esports play also requires physical activity, dexterity, coordination, quick reflexes, visual accuracy and mental focus. Increasingly, esports games such as Space Junkies and Echo Arena focus on the physical movement of the player’s arms and legs (Johnson, 2017). In the future, it is suggested the introduction of emerging technologies, such as AR and VR will further increase esports physicality (Filchenko, 2018). Cunningham et al. (2018) examined ‘sportification’ as esports, resembling sports, or the addition of sports components to esports to attract audiences. This points to the complementarity of playing sport video games (e.g. esports) and playing traditional sports (Garcìa & Murillo, 2019). Furthermore, Garcìa & Murillo (2019) found that viewership and participation in esports is related to interest in traditional sporting activities, suggesting a link between playing sport video games and traditional sports.

In line with discussions regarding consumption and participation in video games, Jang & Byon (2020) made an attempt to categorise esports game market segments, suggesting three categories of esports games; imagination (e.g. based on imaginary worlds, rules, characters), physical enactment (e.g. play requires cognitive skill and strategy), and sport simulation (e.g. emulate real-life sport games, rules and players). Based on these genres, Jang & Byon (2020) examined the complexity and prior knowledge necessary for play, concluding that imaginary esports games necessitate prior knowledge of the gameplay and rules, whereas, the knowledge and skills needed to play physical enactment and sport simulation esports games are secondary, meaning players quickly and intuitively understand gameplay based on prior understanding and familiarity with traditional sports play. Garcìa & Murillo (2019) report a correlation between younger generations, in particular males, playing sport video games which replicate sporting activities. This suggests “interest in sports video games as an activity associated with sports” (Garcìa & Murillo, 2019: 182). This suggests that socio-demographic factors, such as age, gender and education influence likelihood to participate and interest in esports, which calls for further exploration of the differences between male and female behaviours.

It has also been argued that esports has gained institutional stability. The International esports Federation (IeSF) supports esports games, providing regulation and stability (Bányai et al., 2019). Comparably to traditional sports, esports is well established at colleges and universities, gaining institutional status (Funk et al., 2018). For example, South Korean universities classify competitive gamers as traditional athletes (Sorokanich, 2014). Similarly, American colleges and universities now offer academic and athletic scholarships to esports players (Weller, 2016), similar to those of basketball and football players, often covering all college fees (Filchenko, 2018). At Utah University, esports is recognised as a varsity athletics programme (Utah, 2012), similarly, the University of California built a state-of-the-art esports arena for their university-sponsored team (UCI, 2016). This demonstrates increased esports institutionalisation and wider acceptance of esports as a sporting activity. However, it is important to recognise not all sports have governing bodies, likewise, esports is not always planned or structured, and increased accessibility means that esports tournaments also happen on an ad hoc basis, without governing bodies (Chikish et al., 2019). This often requires participating players to have a thorough understanding of the employed technology, such as virtual reality setups.

The continued growth and popularity of esports represents "a new area in the gaming culture, and is starting to become one of the most essential and popular parts of video game communities, especially among adolescents and emerging adults" (Bányai et al., 2019: 352). Jenny et al. (2017: 15) suggested "esports include play and competition, are organised by rules, require skill, and have a broad following. However, esports currently lacks great physicality and institutionalisation", despite having an estimated 588 major esports events in 2017 (Sjöblom et al., 2019) and an increasing level of organisation being required to organise such events (Taylor, 2012). Whether esports can be classified as a sporting activity remains the subject of much debate. Confusion surrounding what we understand as being a sport in general adds to the complexity (Hamari & Sjöblom, 2017). Thus, Bányai et al. (2019: 4) claimed "it remains a future task to come to a consensus about whether esport is a genuine sport or not". Especially as framing esport as a sport or not may trigger different target groups (e.g. game, sport enthusiasts and game or sport sponsors), different business models (e.g. sport/game business models, media/game broadcast models), different content development avenues (e.g. applying sport rules and learnings), different (physical and emotional) health claims and subsidies (e.g. does esport contribute to increase a more healthy society?) and so forth. Moreover, emerging technologies have been adopted in esports to increase physicality. For example, VR as a form of esport games encourage a range of physically demanding activities, such as moving, reacting, running, walking or taking things and pointing objects which are not required from standard video games. Therefore, technological developments are further accelerating esports growth, we can already see the impact of immersive technologies and these developments are set to continue.

One main reason contributing to confusion surrounding a unified definition of esports is the different perspectives from which it is approached. The complexity is heightened by the fact that esports is the convergence of culture, technology, sport and business and, unlike traditional sports (e.g. hockey, football), esports is an interconnection of multiple platforms synonymous with gaming (e.g. computing, media) (Jin et al., 2010). Chikish et al. (2019) supported that esports has a more complex structure than traditional sports, because agents can assume multiple roles, and in this way esports and sports play should be viewed as complementary. They proposed that the "esports industry is opening the new era in the sports industry" (Chikish et al., 2019, p.61). However, according to the Olympic Council of Asia (2017) "the rapid development and popularity of this new form of sports participation among the youth" could be the catalyst for esports to be recognised as a sport in the future. What is evident is that esports represents a fast growing and increasingly popular industry. Given the increased COVID-19 related interest in esports, this is a fitting moment to establish a better theoretical understanding of the scope of what esports entails and how it can be studied in order to drive the industry forward, from both academic and business perspectives. However, it needs to be recognised that due to the current early state of the industry, the definition might need adjustment in the future once technological capabilities and esports setups are more established. Funk et al. (2018: 9) claim "ultimately, it may not matter whether esport[s] is sport", we believe, comparing esports to traditional sports is in fact hindering esports recognition and progression, since it offers unique opportunities and potential beyond what we currently understand from traditional sports. In fact, esports offers new opportunities to expand what we already know and think we know about traditional sports, for example the potential to incorporate and exploit emerging technologies to create new play, participation and spectator experiences, reaching new global audiences.

Table 1 presents an overview of esports studies and definitions, organised in relation to the field of origin, which illustrate the plethora of academic disciplines from which esports research originates. Crucially, this demonstrates how esports definitions have evolved. For example, esports has received significant attention from gaming and culture, sport management, psychology and philosophy and computer science, but less so from marketing, health or economic fields. These observations frame the discussion and synthesis of extant research throughout this paper.

Our working definition presented in section 1 attempts to redefine esports, coordinating varying, sometime conflicting approaches to esports discussed in this section, and evidenced in Table 1. We have attempted to holistically incorporate extant thinking, including the four esports realms presented in our esports matrix and future research trends. We propose this as a flexible definition, and

acknowledge as the esports industry evolves, it will be necessary to update our understand to incorporate market changes such as increasing usage of immersive technologies.

Table 1. Overview of esports studies and definitions

Author/s	Definition	Aim	Methods
Gaming and Culture			
Wagner (2006)	"an area of sports activities in which people develop and train mental or physical abilities in the use of information and communication technologies"	Establish foundation for the study of esports to influence future research	Literature review
Jonasson & Thiborg (2010: 288)	"competitive gameplay which borrows forms from traditional sports"	Future research agenda	Literature review
Witkowski (2012: 350)	"organised and competitive approach to playing computer games"	Examining sportiness of esport	Observations and interviews
Steinkuehler (2019)	-	Coordinate research to augment theoretical, methodological and thematic esports perspectives	Systematic literature review
Reitman et al., (2020)	-	Converge research from different disciplines	Systematic literature review
Sports Management			
Jenny et al. (2017: 4)	"organised video game competition."	Comparison of esports to traditional philosophical and sociological definitions of sport	Conceptual literature review
Funk et al. (2018: 9)	"esport is a modern and highly-structured activity that requires physical actions of the human body to decide a competitive outcome"	Propose inclusion of organised esports events and competitions in sports management	Literature review
Hallmann & Giel (2018)	-	Examining defining characteristics of sports in relation to esports	Conceptual literature review
Qian et al. (2019)	-	Development of motivation scale for esports spectatorship	Mixed methods (interviews and surveys)
Psychology and Philosophy			
Hemphill (2005: 199)	"alternative sport realities, that is, to electronically extended athletes in digitally represented sporting worlds"	Exploration of computer games as form of sport	Conceptual paper
O'Connor et al., (2015)	-	Examination of experiences of MMOG social interactions	Interviews
Bányai et al. (2019: 352)	"esports are alternate sports, and a special way of using video games and engaging in gameplay"	Review of esports empirical studies of from psychological perspective	Literature review
Socio-Cultural			

Weiss (2008: 572)	"playing competitive games according to generally accepted rules of leagues and tournaments on the Internet"	Proposed model for cultural influence of esports engagement	Conceptual paper
Seo (2016)	-	Examination of consumer behaviour and professionalization	Conceptual paper
Choi et al. (2018)	-	Examination of Asian gaming addiction and delinquency	Questionnaires
Computer Science			
Ma et al. (2013)	-	Difference between sports and online gaming	Literature review
Hamari & Sjöblom (2017: 1)	"a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the esports system are mediated by human-computer interfaces"	Examining viewership and spectatorship of esports online	Online questionnaire
Filchenko (2018)	-	Comparison of traditional and esports	Literature review
Marketing			
Seo (2013)	"Competitive Computer gaming"	Identify experiential value of esports and stakeholder networks	Conceptual Paper
Gawrysiak et al., (2020: 1)	"esports refers to organised video game competitions that serve as a non-traditional model of sport that has established itself as a commercialised entertainment enterprise"	Exploration of esports brand utilisation and marketing	Literature review
Health			
Wattanapisit et al. (2020)	-	Exploration of esports related health concerns and related injury /illness	Conceptual literature review
Economics			
Karhulaht (2017: 50)	" Institutionalized player-driven activity"	Relevance of economic research in esports	Conceptual literature review
Parhakov & Zavertiaev (2018)	"Competitive computer gaming"	Comparisons between countries engagement with esports	Questionnaires, Regression analysis

3. Towards a uniform esports framework

3.1 Sport Digitalisation

Growth of esports has been largely driven by rapid advancements of in-home gaming technologies, platforms, video gaming software and console technologies (Gawrysiak et al., 2020). esports games, based on traditional sports have also gained popularity in recent years, as more and more video game publishers collaborate with traditional sports franchises to develop seasonal tournaments and esports representation of the franchises (Raraport, 2017). FIFA (FIFA eWorld Cup), NBA (NBA 2K League) and Formula 1 (F1 Esports Series) are examples of some of the many organisations that have begun to build a digital environment around their sports. This includes tournaments and leagues of various forms depending on the type of sports, from qualifying events and regional leagues to global events such as the FIFA eWorld Cup (The Nielsen Company, 2019). Another reason for increased popularity, according to a recent study, Jang and Byon (2020) reported video games that emulate traditional sports

play, rules and players (e.g. FIFA and Madden NFL) are easy to play, requiring low levels of prior knowledge since players are already familiar with the rules and setup of the sport. Thus, sports simulation esports games, which digitise sports, emerge as a potential driver and promising future market segment of esports consumer gameplay and interaction, leaning on prior knowledge, experience and familiarity with traditional sports.

There is a growing trend of partnerships between esports leagues and traditional sports franchises, driven by profit potential, merchandise, sponsorships, tickets and media coverage (Tang, 2018). A number of traditional sports teams have become digital, creating esports franchises. For example, Manchester City football club recently recruited a FIFA player to lead their esports division (LPL, 2020). Moreover, traditional sporting leagues such as the NBA, have begun to assemble esports teams to play virtual versions of competitions, and their esports team, the Sacramento Kings, have recently started their first season (Filchenko, 2018). According to Badenhausen (2017) incorporating traditional sporting teams with esports teams are more likely to develop permanent, successful and stable financial success. Thus, esports teams are increasingly replicating those of traditional sport, in terms of player recruitment, compensation and contracts (Tang, 2018).

The same as traditional sporting events, esports events involve professional players, teams, uniforms, coaches, managers, agents, leagues, competitions, marquee events, endorsement deals, player transfer fees, colour commentators, highlight reels, college scholarships, and a darker side with match fixing, doping, and gender-related disputes (Jenny et al., 2017; Li, 2016; Segal, 2014). However, the extent to which different games fulfil these criteria varies. More recently, global enforced lock-down and cancellation of major sporting events in response to COVID-19 has forced traditional sports fans to seek alternative ways to fulfil their hobbies. To maintain spectatorships, sponsorship deals, thus traditional sporting clubs are beginning to create esports teams as an alternative.

3.2 Competitive Multiplayer (Computer) Games

Technological advancements have created new opportunities for gaming and gamer experiences. In particular, advances in better and faster internet connectivity enabled small gaming communities, often called clans, to create Local Area Network (LAN) connections between devices to compete against one another in multiplayer computer games (MCGs) (Wagner, 2006; Smed et al., 2002). This spurred a movement away from player-versus-machine gaming towards player-versus-player gaming (Sjöblom et al., 2019). According to Filchenko (2018: 2), this marked the start and "esports naturally began when video games started to incorporate network capabilities and the ability to play against others both in person and around the world". Since 1999, MCG's popularity continued to grow (Wagner, 2006; Smed et al., 2002), as technologies now enable gamers to "communicate and collaborate in joint game sessions" (Manninen, 2003). Advances in streaming and mobile technologies have since created new forms of video games, fundamentally changing the constitution of the gaming sphere (Burroughs & Rama, 2015). MCGs provide opportunities for gamers to collaborate and communicate, competing against one another. There are many popular esports games, spanning numerous genres, such as fighting (e.g. Street Fighter IV), real-time strategy games (e.g. StarCraft II) and sports-based games (e.g. FIFA 17) (Funk et al., 2018). esports includes individual and team-based games, with some popular games such as League of Legends (LoL) involving five competitors (Funk et al., 2018).

Naturally, play expanded from MCGs involving a specific number of people, to multiplayer, to massively multiplayer online games (MMOGs) enabling thousands of people all over the world to participate. MMOGs attract millions of players, as a result gaining more cultural, social and economic importance (Duchenaut et al., 2006). The social nature of the MMOGs is suggested to be one reason for their popularity, and "it's the people that are addictive, not the game" (Lazzaro, 2004). The sharing and shared experiences of MMOGs is considered the main differentiator to single, or MCGs experiences. Often, single player games involve the same activities and features, however, MMOGs offer shared, collaborative experiences, and players can gain a reputation within the online gaming community (Delwiche, 2006; Hilvert-Bruce et al., 2018). MMOGs enable "players to cooperate with each other, forming temporary and permanent alliances to achieve both directed and self-determined goals. These functional alliances (facilitated by mechanisms such as text and voice chat) often develop

into social relationships" (O'Connor et al. 2015: 460). In this way, esports play emerges as a "valuable way of spending leisure time" and a way for individuals to express themselves, build relationships and generate a sense of belonging (Martončik, 2015). Seo (2013: 1544) described esports as a "complex phenomenon", suggesting that in addition to playing games, esports offer "playing computer games competitively (escape), and esports experiences can be amplified by attending esports events (aesthetic), learning about esports practices (educational), and watching esports media (entertainment)". These studies demonstrate the positive effect of MMOGs, to develop skills such as, critical thinking, communication and collaboration.

Much research has examined the psychological sense of community people gain from being part of a group in which they share a common interest, in this case esports (e.g. Hamari and Sjöblom, 2017; Hilvert-Bruce et al., 2018). Many MMOGs are designed to promote sociability, communication and collaboration in the environment (Sourmelis et al., 2017), and are synonymous with the underlying theme of togetherness (Manninen, 2003). Hilvert-Bruce et al. (2018: 59) found "social motivations, such as meeting new people, social interaction, and sense of community are important to live-stream viewers". For instance, O'connor et al. (2015: 471) identified that one of the key aspects of World of Warcraft was the breakdown of "traditional social and geographical borders that allowed a greater diversity of relationships to develop". They found that players felt a sense of community, belonging, gaining different social identities and social support from their relationship with other players, often forming gaming communities. Players also reported they accessed and provided support, and gave or received emotional support within the community (Hilvert-Bruce et al., 2018; O'Connor et al., 2015). Martončik (2015: 211) reported spectatorship and esports play extends beyond gameplay and "can also serve as a means of satisfying various needs, e.g. the need to belong by forming friendly relationships through the membership in game teams (clans) and participation in LAN parties, or by satisfying the desire for leadership through upholding the position of a game team leader and determining its course of action". Research also identifies educational benefits of MMOGs. esports players are reported to develop enhanced literacy, attention, reaction time and higher-level thinking (Delwiche, 2006). Similarly, Squire (2006: 23) identified "the most intense social learning is found in massively multiplayer games, where players interact with thousands of other players in real time over the internet". Many MMOGs require players to synthesise, analyse and evaluate information, apply critical thinking and solve problems thus, they may be considered as learning environments that support players in gaining, the so called 21st century skills which can be potentially transferable in real life (Dickey, 2007; Susaeta et al., 2010).

Recently, there have been experiments with player versus artificial intelligence (AI) games. For example, at a recent Defence of the Ancients (DOTA) tournament, highly trained skilled player 'Dendi' played against prototypical AI, 'Open AI', a bot that had been trained through thousands of games equivalent to 180 years of play in one day. In August 2018, in a team-based tournament, one human and 4 bots played as a team with the component claiming "the teamwork aspect of the bot was overwhelming" (Salicki, 2018: 5). There is no doubt that AI, machine learning and big data analytics will change the esports arena, opening up new opportunities and expanding the boundaries of possibility. There have also been experiments with AI and real-time strategy in Starcraft, in the past few years, with three notable competitions with regular 'bot' players. However, comparing the results of 'bot' and human players, "a significant amount of open questions remains about how to design AI systems that can handle real-time adversarial domains such as StarCraft" (Churchill, 2016: 17). Over time, the size and popularity of clan gatherings increased, eventually attracting corporations offering sponsorship packages to events, funding prizes and providing equipment in return for advertising (Taylor, 2012). For example, Red Bull began sponsoring professional video game players in 2008, and are now developing a High Performance esports Lab to help enhance the performance of novice and professional esports players, utilising technologies such as eye tracking and monitoring brain activity to gain insight into the performance of esports players (Gaudiosi, 2015).

3.3 Digitally enhanced Sports

New forms of esport have started to emerge where a traditional sport is enhanced through digital means. Examples include basketball, American football, football and formula 1. Reasons for doing so are numerous and range from creating new experiences, attracting new audiences, increasing multiplayer

options, challenging new skills and of course fun. However, there are also challenges that hinder development, ranging from costs, to technological challenges (e.g. the need for 5G) and difficulty implementing rules and boundaries.

The use of digital and immersive technologies to enhance physical sports has been studied for more than a decade, for example AR has been use to supplement sports such as ping pong with digital enhancements (Soltani & Morice, 2020). Similarly, Altimira et al. (2016) altered the difficulty and rules of the game through augmented enhancements to influence player performance and game balancing between players of different skill levels. This creates opportunities to have players on different skill levels compete against each other in a wider selection of sports. Although such player balance has been possible in parallel games, such as golf or bowling, where points can be added or subtracted based on the different skill level, it has been more challenging for non-parallel games, such as football or tennis, where players influence the opponent to achieve a goal. Prior studies have shown that such game balancing efforts that create a closer competition and distort the outcome can enhance player engagement (Bateman et al., 2011; Mueller et al., 2012).

Altimira et al. (2016) studied the effect of augmented adjustments in PingPong on performance by altering players' surface area using projectors to modify the size of the table. In their study, they argued that augmented esports was able to alter players' performance and balance, through stimulating game mistakes of better players, and restricting their performance to allow for players of different skill levels to compete against one another. In addition, their study showed that augmented esports was able to influence the style of play of participating players through modified player dependent conditions. Another study in a similar setting had previously been conducted by Ishii et al. (1999: 2) using "athletic-tangible interfaces" to use tangible objects and full-body motion with augmented reality to create a setting of 'computer-supported cooperative play'. In their study, sound-based ball tracking was used to modify the rules of the game and create setups where PingPong players would work together towards a collaborative goal or transforming the objectives of a competitive setup. However, due to the newness of this category and despite a number of studies suggesting potentially interesting transformations of traditional sports in rules and player performance, this type of augmented esports has not been studied to a great extent.

3.4 Immersive Reality Sports

The distinction between real and virtual is becoming increasingly blurred. Fundamentally, MCGs are shared-space technologies, facilitating different levels of immersion, from synthetic (computer generated data) to physical (rooted in the real world), in addition to different realities, from local (remain in physical world) to remote (leave your body behind) (Benford et al., 1998). According to Delwiche (2006: 160) "the convergence of high-speed Internet connections, sophisticated graphics cards, and powerful microprocessors has paved the way for immersive virtual environments populated by thousands of users simultaneously". These environments, often called multi-user virtual environments (MUVEs) or massively multiplayer online games (MMOs) allow players to create and share content (O'Connor et al., 2015). Within these virtual worlds, players are represented by avatars, 3D representations of the user "which mediate their interactions with the virtual environment and other users" (O'Connor et al., 2015: 459). Often avatars are highly personalised, and as such "some users spend more waking time with friends in the digital world than with human beings in their physical environment" (Delwiche, 2006: 126).

Emerging technologies, such as augmented reality (AR), virtual reality (VR) and mixed reality (MR) offer new levels of experience and interactivity. Based on the VR continuum presented by Milgram and Kishino (1994: 22) "VR can be understood as an environment consisting of a mediated observation of solely virtual (digital) objects that do or do not reflect real reality". In between, MR combines real world and virtual world objects. "Different terms are used to designate the space within the MR boundaries,

such as Augmented Reality, Augmented Virtuality, Trans-Realities and Altered Reality, based on the ratio between real and virtual objects and the reality-fiction proportion of the virtual objects" (Van Gisbergen, 2016: 5). The added value of VR in esport compared to other means of mediated esport lies in the combination of four VR technology dimensions (sensory, interaction, control and location), that create a unique experience of "presence" or "being there" (van Gisbergen, 2016). esport games such as Echo Combat and Space Junkies use VR technologies, mimicking the player's movements in the real world. The recent release of the NBA online VR subscription package allowing spectators to watch 27 live games in VR is likely to increase demand for immersive esport experiences (Kim & Ko, 2019).

New developments in VR technology dimensions increase the usage of VR in esports, for instance, companies have begun to use omnidirectional treadmills (interaction dimension), strapping the user in to centralise them on the treadmill and stimulate their movements in VR (Filchenko, 2018). These techniques are now being used in esport competitions as well. In the future, not only will VR and AR technologies such as these minimise distinction between virtual and real worlds, but also increase the physicality and player movement. New research indicates that the use of VR can indeed increase the experience of mediated sport in esport broadcasts (Van Gisbergen et al., 2020). Jang and Byon (2020: 123) proposed "if gamers are motivated to engage in a continuous play of a new esports game, their gameplay intention will have to be such that they successfully adopt the technological system associated with their esports game". Moreover, research suggests, consumers are increasingly seeking a home watching experience on par with live sport events. VR creates opportunities to enhance experiential depth, giving a viewer the sense of being at the game. In a recent study, Kim and Ko (2019) coined VR spectatorship (VRS) as an emerging sports media consumption trend, in response to increased consumer demand for high quality services, game watching experiences and experiential elements which are difficult to create via traditional mass media (e.g. 2D television). They examined consumer flow experiences (the psychological state of enjoyment, cognitive absorption and time distortion) reporting VRS enhanced the quality of sport consumption and enhanced user experiences compared to 2D platforms.

However, the success of esport as an immersive reality also depends on success in all five VR adoption dimensions (Van Gisbergen, 2016). This means immersive esport needs to be affordable (cost dimension), requires good and comfortable technology that can compete with other media (channel dimension), needs to support multiplayers or spectatorship (connection dimension), should be easy and affordable to produce (creation dimension) and access to software development platforms to create VR experiences (content dimensions). As all dimensions are still in the developmental stage, esport as an immersion media, remains in its infancy and encounters difficulties reaching large audiences. Viewership for VR esports for instance is significantly lower compared to watching esport games through other media, because viewers tend to prefer watching games they themselves play, many of which are not currently immersive esport games (esports Observer, 2019). In addition, it is still uncomfortable (e.g. eyestrain) to watch esport in VR for a longer duration than 20 minutes, which presents barriers, considering that traditional esports streams are broadcast for hours (Park, 2018).

4. The esports Matrix

To advance conceptual and empirical understanding of esports, based on extant literature, definitions and perspectives presented in section 2, we propose a unified esports Matrix as the basis for further research and development in esports (see Figure 1). Thus far, a limited number of studies have made an attempt to classify consumers that engage in esports (e.g. Williams et al, 2008; Jansz et al, 2010). Lee and Schoenstedt (2011) as well as García and Murillo (2020) further analysed the link between traditional sports and esports to investigate the degree of complementarity to one another. Based on the definitions of esports derived from prior literature in multiple fields, we propose four realms that distinguish esports; esport as a representation of current physical sports (Sports Digitalisation), esports as traditional (multiplay) game experience (Competitive Multiplayer Computer Games), esports that modify existing sport and player rules and setups through digital augmentations (Digitally enhanced Sports), and new types of immersive esports involving the implementation of VR (Immersive Reality Sports). The latter could potentially lead to new emerging forms of esports, as well as change current

traditional sports. These opportunities are discussed further in the following section, through elaborating on opportunities and directions for future research as well as challenges for further development.

Five esports industry experts were involved in the development of the esports matrix to increase its relevance and validity. The experts were selected to represent an international context with different sizes in the esport Market (The Netherlands, Korea, Germany and USA). Each expert represented a different esports speciality (including; esport branding and media planning, esport league organisation, VR esports research, esports stadium advisory committee and esport game competition). During esports Matrix development, experts consulted and were involved in discussions that shaped the matrix. The expert from Germany, Martin Muller, is currently Vice President of the German esport league, setting up several esport platforms and competitions. The expert from the USA, Thijs van de Wouw, a former professional Call of Duty gamer (second in Europe in 2005), is currently planning director at Wieden and Kennedy, and is a former senior strategist at Droga5 and AKQA and has worked on prize winning game, esport branding and strategy cases for brands like Activision (e.g. Destiny and Call of Duty), T-Mobile (Sprint), Arena of Valor and Game of Thrones. Mart Roumen (Content Marketer) and Elmar Crack (Policy Manager) work with mobile and broadband provider VodafoneZiggo, on projects such as r Ziggo ebattle F1. Seungyong Han, the Korean esports expert, is co-founder and CEO of two Korean esports companies, on the advisory committee building an esports stadium in Gyeonggi-do, Korea, and VR esports academy research director.

Experts' understanding of the industry and their respective experience was used to inform and verify the usefulness, suitability and relevance of the esports Matrix. The three main topics discussed with the experts were aligned to the aims of this paper; how to define the scope of esports?; what knowledge is necessary and relevant in these categories?; and where do we stand now and what is the future of esports? Thus, their insight on each of these domains informed the design of the esports matrix, ensuring its relevance and applicability as a framework to advance current understanding and assist industry practitioners to conduct more structured future research to advance esports maturity.

In particular, experts' suggested defining categories would help reach and engage wider audiences from different backgrounds. For instance influential esport decision makers have backgrounds in traditional sports, and as such incorporate a schemata based on traditional sport experiences, mainly linking with the Sport Digitisation category, but may not be applicable to other categories. In addition, in countries such as The Netherlands or Germany, it is important to focus predominantly on categories that involve traditional sports, able to incorporate large enough (media and live) audiences, since these regions are largely characterised by smaller competitions and more traditional brands, when compared to Asia or America. The experts revealed esports based on traditional sports (sport digitalisation) will remain a smaller esport market, compared to those based on competitive multiplayer games.

The experts also highlighted whilst there are differences, many questions and features remain the same, for instance regardless of the category, they consider esports predominantly engage younger audiences. The Korean expert, suggested in Asia esports has already progressed from the upper-left of the matrix 'competitive multiplayer computer games' to the upper-right 'immersive reality sports', and future esports growth will transpire in each domain of the esports matrix. In addition, brand managers and strategists want to know how to activate brands in esports, how to curate content to reach brand goals (regardless of the category) and how to create partnerships and deal with rights and IP and laws. Within all categories fans and professionals are open to new technologies, openly expressing love or hate for brands. Crucially, the experts acknowledged that the esports Matrix, in particular categorisation helps pinpoint new and future esports developments, suggesting physically active categories will become more prevalent because of new technologies (ranging from 5G to VR). Experts' revealed differences in the extent of technology-enhanced esports in each nation, in Asia VR is already widely accepted and adopted, thus technological enhanced esports has grown. Overall, the esports experts recommended competitive multiplayer games will remain the main focus for future esports growth and development.

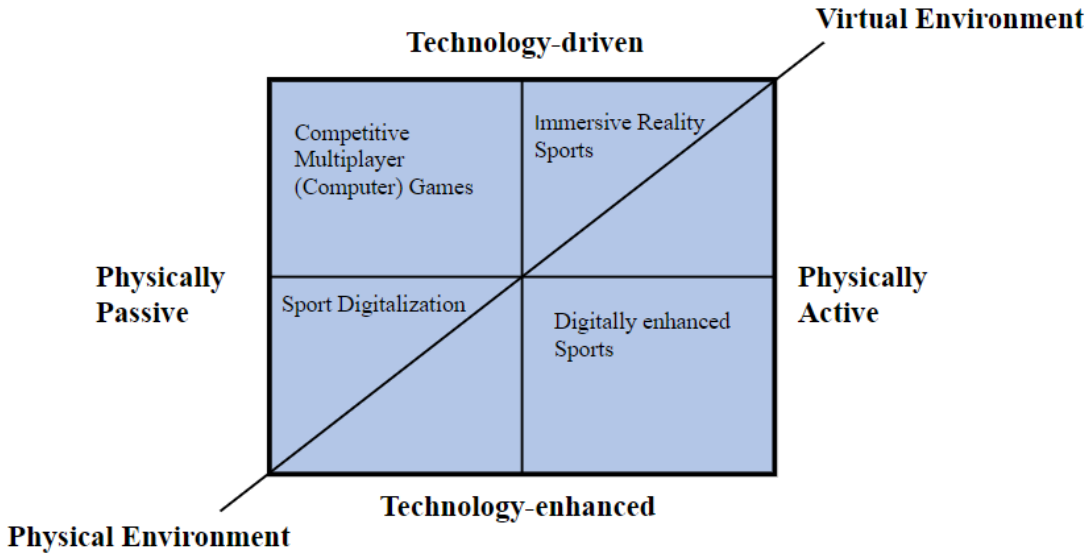

Figure 1. esports Matrix

5. Discussion and Future Research Directions

Based on the review of existing literature, we have identified three scales in the categorisation of esports (see Figure 1), which will be discussed in the following section. Key considerations are provided and future research directions are proposed that relate to each scale of the matrix. The scales include three distinct esports categories; physical activity (passive-active), role of technologies (technology driven-enhanced) and virtuality (physical-virtual environment). esports can be mapped depending on the position of the activity on each scale.

5.1 Physical Activity in esports

Filchenko (2018) claimed that in the future esports will become increasingly physical with the introduction of emerging technologies, such as VR. Similarly, esports games such as Space Junkies and Echo Arena are increasingly focused on the player's physical movement of their arms and legs (Johnson, 2017). esports games that require physical enactment, such as cognitive skills, fast reactions and movement, required for fighting and shooting gameplay (e.g. Evolution Championship Series) increasingly require in-game gadgets and equipment. In comparison to imaginary based esports games (e.g. World of Warcraft), physical enactment games are intuitive based on prior knowledge and familiar second nature movements expectancy, thus driven by hedonic motivations, and hindered by effort expectancy (Jang & Byon, 2020). According to the experts, this is one of the reasons for an increasing interest and development in sport digitisation and digitally enhanced sports esports Matrix categories.

While the majority of current esports tournaments and events are based on, online multiplayer competitions, first-person perspective VR drone racing as well as Mixed Reality (MR) sports continue to develop and gain popularity among consumers. MR environments are expected to create a break-through in allowing for the combination between technical skillset and control and physicality, possibly entering the long-awaited definition of esports. However, this is an area of research that remains underexplored, and would benefit from a structured research approach examining the adoption of emerging technologies for esports purposes, as well as the impact of these types of activities on consumers' physical and mental health.

Combining physical activity with technological devices will require suitable hardware and software to accurately measure and provide in-game reactions to the physical movements. This possibility opens new ventures and research opportunities into in-game adjustments that could alter the difficulty level among players and allow skilled professionals and amateurs to play collaboratively. Moreover, this presents opportunities for strategic partnerships between sporting bodies such as FIFA and developers,

hardware and technology providers. We recommend further research in this area through an interdisciplinary perspective that would allow the measurement of physical skills with suitable in-game adjustments. Furthermore, as physical activity increases in the esports setting, it raises the question how much physical space allocation is needed to fully embrace the physical activity, at home and in public settings. For example, future research should examine the facilities such as physical space, virtual mapping of the physical environment and connectivity requirements necessary to facilitate physical esports play and consumption. As these types of esports are still in their infancy, further research is essential to understand the requirements in the physical environment to advance this field.

5.2 esports Environment

The degree to which esports environments are rooted in the real or virtual world varies. The authors and the experts distinguish between three major geographical areas, Asia, Europe and the United States. Although the experts claim this does not mean there needs to be a differentiation between these areas within the five esports Matrix categories, it is important to understand the different ways these areas operate within the categories. Whilst there are similarities, each nation differs with regards to their position on the matrix. These differences relate to budgets, fanbases, number of professional players and leagues (rewards), and even simple things such as language barriers for global players and fan communities. For example, the esports industry is well established in Asian markets. In South Korea, esports is an accepted and well-represented activity with a large follower base. esports are not only streamed online, but also through established dedicated television channels. In Europe and Americas on the other hand, it can be observed that esports followership is less present in the physical environment and activities are based largely online through media channels, such as Twitch and YouTube. According to the experts, it is particularly difficult for traditional media to reach and engage the esports audience (matrix categories 1 and 3) in nations such as The Netherlands, without involvement of brands such as FIFA (matrix category 1). Whilst the underlying online infrastructure might have an influence on the notable difference in geographical areas, another reason might be the cultural framework where esports evolves. Since Western cultures are often more associated with individualism, whereas, cultures in South Korea tend to be collectively organised, this might have a strong influence on how fast entertainment and sports followership develops.

The current state of the esports industry, provokes questions around how such tremendous live crowds need to be organised to maximise impact and growth of the industry. European countries have so far facilitated only a limited number of live leagues, which raises the question, whether live events of the same scale as in Asia are possible or achievable. Experts' claimed that especially in Europe, there is a key need for research to identify how smaller live leagues can be organised and broadcasted and be connected to other events and media in all categories of the matrix. This is crucial for establishing presence in the European market. However, this implies that the role of broadcasters needs to be re-evaluated. It is questionable whether the same skillset of traditional sports broadcasters applies to the esports context. This has matured faster in the Americas, where esports games and leagues are already being broadcasted and moderated by acknowledged broadcasters in the online environment. While the online followership in the Asian and American regions seems to grow exponentially compared to European counterparts, the role of brands has so far been limited to company sponsorships (e.g. NVIDIA, Monster Energy Drink). In South Korea on the other hand, major companies such as Samsung, SK and LG have established their own esports teams that compete in various leagues against one another, with the ability to buy out players for the team, as demonstrated in soccer, American football and many other team sports. For brands, reaching consumer crowds that are engaged in esports is a challenging and daunting task; 'digital natives' spend large amounts of their day in online environments, whilst also one of the quickest to block any online advertisements. For brands, getting involved in the esports ecosystem is therefore a potential vantage point to reach this target audience in an engaging way. However, in all matrix categories, we recommend further data and structured use of evidence is necessary to support future growth. This also presents opportunities for brands to enter the esports market by negotiating sponsorship deals, which in turn enables them to improve their brand awareness

and engagement with new target markets and demographics. This also presents opportunities for stakeholders to collaborate and co-create value, to increase engagement and profitability.

Recent limitations in outdoor activities caused by the COVID-19 crisis have shown online streaming and gaming activities increase drastically. Whether esports spectatorship has increased due to the crisis and whether it continues to increase remains to be seen. However, the esports industry is not comparable with other types of media consumption of passive spectatorship. Ratherm it offers more in all categories, with regard to active audiences and data driven engagement. Also, pandemics like COVID-19 might increase the importance of the Immersive Reality category, through VR, to mimic live esport experiences. The experts' supported that increased adoption of immersive technologies will advance the esports industry. Although the added value of these immersive technologies on esport (branding) experiences needs more research. We propose further research to understand audience engagement and branding in the digital environment in all categories. We expect future evolving digital industries to demonstrate increasing similarities with the esports market than we have with other established types of media. More specifically, there seems to be a high potential of exploiting unpaid brand endorsement and new engagement structures with brands. Further research into the marketing potential, and branding opportunities and consumer engagement in the dynamic esports environment is required.

5.3 Role of Technology in esports

The experts acknowledged a crossover between all four esport matrix categories, promoting research into the use of new technologies to improve the audience experience. However, all categories have a difference in main broadcast technologies (brands) they are connected to. Major investments in esports related activities can be tracked in the Asian region (Bányai et al., 2019), and is steadily increasing. Investments are not only linked to increasing spectatorship and prize pools, but also in the refinement of technological updates and adoption of emerging technologies. For esports stakeholders to remain competitive in the growing marketplace, it is crucial that technological differences are levelled across players in official tournaments, to facilitate play, participation and spectatorship. For example, in the UK there are a growing number of esports cafes, providing access to high specification gaming computers, streaming and casting booths, viewing screens, and professional esports equipment. These help increase access to necessary and latest technologies to seamlessly host and stream tournaments, as well as building the UK esports community. In the online environment, a major difference can be observed in the abilities and resulting success rate of players dependent on hardware capabilities, such as processing power, graphics card and mouse sensitivity. Such considerations are also common for esports tournaments such as the Fortnite World Cup or StarCraft tournaments prevalent in South Korea, where players use the same hardware setup to level technological differences and demonstrate their mastery of the esports through skill. Faster processors and rendering allow for faster reactions in control and enhanced response time, which have significant impacts on game play. As a result, official esports tournaments broadcasted in Asia are held in established esports stadiums that guarantee the use of the same equipment and hardware.

With the introduction of VR in the consumer market in 2013, exploring the use of VR in the esports context is a logical avenue for future research efforts. In particular, VR creates a sense of presence in the computer-generated environment that allows the user to embody virtual characters. Not only does this support physical activity much beyond the sole engagement of hands, (e.g. in online multiplayer games), but also provides opportunities to create virtual environments, offering greater interaction opportunities not possible in physical environments. Whilst, further VR developments are necessary with regards to processing power, multi-user experiences and real-time responses, it provides an ideal setting to combine physical activity with virtual environments, bridging the on-going discussion and opposing arguments whether or not to define esports as a real sport.

As previously discussed, the development of integrating digital technology to enhance traditional sports types allows people of various skill sets to compete with each other, creating opportunities for larger crowd engagement, to what was, until now, only reserved for competitions among professional players. This development exponentially motivates a large crowd, and can positively contribute to societal

health. Using technology to track players' and personal health conditions could assist in targeting weak muscles and strengthen specific areas of the body. Using such tracking technology in the esport context opens another layer of discussion among broadcasters and spectators, as well as giving players and coaches insights into various team combinations and strategies. However, more research is needed to examine the use of health tracking devices and benefits of monitoring players' health for personal, as well as medical purposes. More specifically, we advocate for further research exploring the use of smart technologies that can be integrated in physical activities (e.g. as currently used in fitness trackers), in the esports environment. In this way, the esports context can create an environment where game adjustments could be integrated to support physiological therapies.

6. Conclusions and Future Considerations

Esports popularity is growing rapidly, even more so because of COVID-19. However, fragmented research from multiple extant realms has delayed understanding, definitions, classifications and crucially realisation of esports business potential. Currently, this is hindering esports industry growth. This paper presents the esports Matrix (see Figure 1), which augments previous research into a unified model to progress current understanding and enable organisations to capitalise on opportunities presented by esports. The esports Matrix presents four distinct realms that distinguish esports, including; esport as a representation of current physical sports (Sports Digitalisation), esports as traditional (multiplay) game experience (Competitive Multiplayer (Computer Games), esports that modify existing sport and player rules and setups through digital augmentations (Digitally enhanced Sports), and new types of esports involving emerging technologies such as virtual and augmented reality (Immersive Reality Sports). The inclusion of the five esports experts' industry knowledge in the development of the matrix verifies its suitability and relevance as a tool to advance current understanding. To advance the esports sector, we call for all stakeholders and in particular, practitioners, managers and industry to utilise the esports Matrix to advance the industry, and conduct future research in a more structured manner. Future attention should focus on understanding audience engagement, esports communities and identifying indicators for esports maturity to enable growth and realisation of esports industry growth potential that involves all stakeholders.

6.1 Audience engagement in esports

In the last few years, viewership in esports has grown significantly. In South Korea, esports already has a large followership. For example, 54% of global esports players are in Asia-Pacific (NewZoo, 2020). However, while this creates visibility and general acceptance of esports in society, the audience largely remains as spectators, with limited direct engagement. Nonetheless, in South Korea, and to a lesser degree in Europe (386 million players in 2020) and North America (210 million players in 2020) (NewZoo, 2020), certain degrees of engagement within online discussion channels can be observed. However, these are typically conducted through a gamer's personal live stream, which facilitates fan interaction on a personal basis with the professional player.

The number of traditional sports going digital continues to increase. Live-streamed esports game casts, such as League of Legends (LoL) attract significantly higher viewership than traditional sporting games, such as the NBA finals (Burroughs & Rama, 2015; Steinkuehler, 2019). Live-streamed esports events give viewers control, such as changing camera angles, layering features, chatting with fans, and adding elements of interactivity. Whereas when watching traditional televised sports, the broadcaster remains in control, dictating the viewing experience (Seifts, 2019). Twitch.TV, owned by Amazon, one of the most popular esports streaming services provides a streaming space to watch and stream digital video content. Twitch empowers gamers to stream themselves playing games, communicate with the audience in real-time, blurring the boundaries of what is real and what is virtual, between the game space, social networks, and face-to-face communication, production and consumption of gaming and virtual worlds (Burroughs & Rama, 2015). Therefore, platforms such as Twitch and YouTube allow "streamers to serve not only as players, but also as performers and entertainers" (Reitman et al., 2019: 10), changing traditional consumption and spectator rules.

However, growth of audience engagement provokes the question whether more widely accessible and organized engagement opportunities will be needed in the future. A possible example of organised spectator engagement was created by MondoBox, a platform launched in 2019, that offers meta-game experiences where the audience can actively participate in watched content, to place sports bets or interact with players (Mondobox, 2019). Within online streaming environments, personal interaction with professional esports players is easily facilitated, as fans can directly engage with professional players through the player's own channel of communication on YouTube or Twitch. Elevating these possibilities from a personal streaming channel to an official channel could potentially open new ways of audience engagement in sports in general. This should not be reserved for online multiplayer type esports, but could also revolutionise the engagement of audiences for traditional sports types, as many traditional sports are becoming more digitised. However, to date, there is limited insight into the effectiveness and audience engagement through using official channels. As discussed in the context of the esports environment, more research is needed in this field to understand the motivations of audience engagement to participate in official online channels and form communities. Whilst studies have examined motivation to play (e.g. Seo, 2013; Weiss & Schiele, 2013), and spectate esports (e.g.Hamari & Sjöblom, 2017), extant studies recognise the need to further examine esports consumption and engagement motivations (e.g. Chikish et al., 2019; Pizzo et al., 2018). For example, Pizzo et al. (2018) revealed significant differences between different motivation contexts that influence esports game attendance, acknowledging a need to further examine similarities between traditional and esports consumption to inform future esports management and marketing strategies. We support that further examination is necessary to better understand the motivations and interaction possibilities to help inform future decision-making and strategies for brands to reach an audience that is otherwise difficult to access through traditional channels.

6.2 esports communities

As the world of esports is maturing, it has developed many characteristics of physical communities, such as the use of specialised language depending on the game and type of sports, political structures that not only define a hierarchy, but also roles within the community, complex social rituals and shared history (Steinkuehler, 2004). Such communities are not only growing within a single platform, but often represent transmedia concepts, whereby additional content and events are peer-generated, connected across various channels. However, in a multifaceted environment, the resulting community have multiple layers, which provoke questions regarding how such communities and participants within these can be segmented. For example, extant research observed different levels of esports engagement among males, females and different cultural groups, but do not reveal how to overcome barriers to engagement and foster a more global esports community. Traditional segmentation approaches often employed for marketing purposes provide limited insights into the type of user, motivations and loyalty drivers. Suitable indicators can potentially be identified within the game preferences of the user and style of engagement with esports channels. While consumers in the field are so far seen as loyal to certain brands, it needs to be understood that this follows expectations of the brand to continuously support the growth of the industry. Players will punish brands that are only engaged for short-term gain. This may become particularly evident post-COVID-19, when organisations regain focus on their traditional sporting events, thus ignoring their novel esports consumers. Hence, understanding how esports communities are formed and affect consumers is therefore an additional key research area that needs to be better understood. We expect this industry to have a measurable effect on society as communities evolve and participants increase globally. Crucially, we suggest future research should examine attention, knowledge, experience and in-game buying behaviour, as key indicators to provide insights into the type of consumer actively engaged in esports. More detailed analysis of the specific characteristics and challenges in specific disciplines is necessary to advance and continue to support esports industry growth. Thus, it is crucial that different disciplines (e.g. economics, sports management) and stakeholders collaborate, share data and work together. There is much to be learned from the psychology perspective on how consumers are triggered and what stimulates engagement,

which is beneficial to design marketing strategies and branding activities that resonates with the esports audience. Likewise, as the esports industry is growing and interacting on a global scale, it is crucial for brands targeting a global market to understand how the culture and gaming patterns in specific regions affect consumer behaviour, or how technological advancements studied in computer science will impact the employed technology in the future of the industry.

6.3 esports Maturity

According to Marques (2019, p.25) "to maintain this rate of growth in the coming years, an ever-increasing number of investors and stakeholders must be attracted if esports ever hope to attain the same level of acceptance and prestige as traditional sports competitions". To some extent, the Coronavirus pandemic has propelled esports into the public domain, as traditional sporting organisations are seeking ways to maintain engagement with their fans, sponsors and stakeholders. For example, in response to cancellation of all races, Formula 1 developed an online esports alternative, streaming weekly esports versions of all cancelled races on Twitch and YoutTube. Early research confirmed demand and fellowship of esports has increased because of COVID-19 (Heinrich, 2020). Moreover, Clark (2020) reported Counter-Strike broke records, hosting over 1 million concurrent players. Similarly, Twitch reported a 15% increase across their platforms since global lockdowns. To maintain the growth of esports into maturity, more structured investments of recognized companies are needed to ensure trustworthiness and secure financial transactions. To date, Microsoft, Coca-Cola and Amazon are among the key investors in the field (Marques, 2019), and is expected to attract a larger investment community in the near future.

For players, it is important to turn esports into a more profitable, respected and safe career choice that allows stable income and employment opportunities. However, as the industry is still fragmented in its governance and self-organisation of events, business models relevant for esports need to be developed. Moreover, as identified by the broad variation in the perspectives and approaches to esports according to stakeholders' specific sectors and interests (e.g. law, economics, healthcare), such have to some degree hindered acknowledgment of esports relevance. Likewise, comparing traditional sports and esports have further hindered realisation and exploitation of the full esports potential. We expect businesses to take the lead in governing the risk of future developments and structured growth of the industry. This means that businesses need reliable consumer and industry data to support investment opportunities. Further empirical research is necessary at both industry and participant level, as well as across the wider stakeholder value network. Our knowledge in this field is still limited, with predictions lacking accuracy due to the infancy of the industry and potentially skewed rapid COVID-19 popularity. Therefore, more suitable experience measures and critical reflection on the existing data are essential, while regarding esports as an industry that is profoundly different from other industries due to the engagement opportunities and consumer base. Crucially, future data should be shared across disciplines to encourage a holistic approach to better inform future esports growth and strategies. This will allow other disciplines as presented in Table 1 to further build on one common body of knowledge to avoid further discrepancies when developing this field of research. It is an industry that has largely grown due to the active involvement and content creation of consumers, who are empowered to freely create adjusted versions of certain esports to customize the playing experience. While a few years ago this was restricted to a limited number of users, creating and sharing content has become increasingly popular, creating new business models.

We hope the esports Matrix contributes to new esports opportunities that capitalise on the potential to harness innovative and emerging technologies, engage new audiences and establish novel organisational structures to advance esports development. It is our hope that the esports realms identified in the esports Matrix inform future research and development, providing a more structured and unified approach to realise esports potential.

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